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ABSTRACT

Research was conducted to develop learning environments based on CD-ROM and printed material specifically for vocational secondary students with reading and writing difficulties. Parties to the action research were Austria, the United Kingdom, Portugal, and Finland. Finnish partners concentrated on learning environments that would diversify and improve use of existing CD-ROM programs. Eleven Finnish instructors in different fields kept diaries of their work and wrote a report on the performance of each student involved in carrying out the learning tasks. In cooperation with students, instructors developed an evaluation tool emphasizing CD-ROM program suitability for poor readers and identified 35 suitable programs, although none were developed for native language teaching. Because students often failed to take notes while using programs, a pedagogical model was developed with other easily readable material to support the CD-ROM program. Over 60 students participated in final development of learning tasks. The basic structure of the task was that the student would do the following: (1) remember what information he/she possesses about the given topic; (2) become acquainted with the operation of the CD-ROM program; (3) retrieve information from the CD-ROM program assisted by questions; (4) start to plan the essay by means of pre-gathered information, turning it into a mind map; (5) write the essay using the mind map; (6) use the spellcheck function to make corrections; and (7) print it or send it to the instructor by e-mail. (YLB)

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Integrating CD ROM, literacy and writing into vocational education

1. Introduction

The aim of the research was to develop learning environments based on CD ROM and printed material especially for students in vocational secondary education with reading and writing disabilities. The results of the research are founded on an action research with four acting parties, Austria, UK, Portugal and Finland. It was chiefly conducted by practicing instructors.

More and more young students in vocational schools and institutions have an inadequate competence in their native language. In Finland, every fourth vocational student has some reading deficiency, even if hardly any of them are analfabetics. Those in need of additional practice in the mother tongue do not necessarily identify that need (Hilgendorf 1998, 475). They would often like to study practical vocational skills. The primary pedagogical idea of the study was integrating reading and writing skills into other forms of study.

In planning the learning environments the guiding principle was that knowledge is generated in a social process shared by teacher and students. The approach establishes a closer and more equal relationship between the instructor and the learners.

The supply of study materials exploiting multimedia is increasing rapidly and their quality is improving in the English-speaking area (Farmer 1999, 60). One reason for their relatively infrequent use could be the unavailability of sufficient initiation into the method (cf. MacKellar & Elliott 1999). Since it is costly to produce multimedia, the multimedia market in minor language areas expands more slowly.

There are hardly any practical examples of CD ROM -pedagogy to be found in scientific literature. They originate in institutions as ordinary working experience. Consequently, instructors create tacit knowledge, worth analyzing and publishing.

2. Materials and methods

The research was conducted 1997-1999. The frequency of reading and writing problems and the need for remedial programs varies in different European countries. There are some five million people in Finland with Finnish as their mother tongue. The research tasks were assigned so that

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Austrian, Portuguese and British partners either developed or translated those CD ROM programs which would be suitable for learning-disabled students and the Finnish partners concentrated on learning environments which would diversify and improve the use of existing CD ROM programs. The findings presented here are mostly from Finnish institutions.

The project team of the Finnish institution consisted of an instructor in Finnish as a primary project worker, 11 instructors in different fields, one research assistant and the research leader (the college principal and the first writer of this article). The project worker has observed most of the students from the beginning of their vocational education. Except for one instructor with research training and the leader of the research, the instructors were general practitioners. Alongside the CD ROM research the members of the team attended to normal teaching, and as a consequence they associated with other teachers regularly. Information concerning the research was readily available for everyone on the intranet of the institution. The duty of the project worker was to be in charge of the consistent progress of pedagogical development work. Simultaneously, she promoted a change in the learning culture of the institution during the two years ` collaboration.

The vocational subjects involved were art and culture, mathematics and physics, educational science, nursing science, social sciences, natural sciences, environmental protection, agriculture and home economics. Some tasks were developed for students in metalwork and textile as well.

In the research, data were gathered in different ways. Each member of the project team kept a diary of her/his work. The project worker drew up a report on the performance of each student involved in carrying out the learning tasks for the study. The objective was that the learning environments to be developed should gain acceptance among teachers for their routine work and that the teachers as a whole should also learn.

3. Market account

At the first stage of the project the instructors in cooperation with students made a market account of CD ROM programs in Finnish. The whole project team collaborated to develop the evaluation tool, emphasizing the suitability of the program for poor readers. They assessed for example whether the operating path was good, the fonts clear and the text size large enough or resizable and whether the multimedia features of the program (speech, other sounds, text, picture, animation, video) had been utilized appropriately for learning. Their intention was to find a suitable program in the native language for vocational students with reading and writing disabilities. (cf. McCann 1996)

Studying the market had its difficulties; the information was scattered and not always reliable. The instructors in different fields were, however, able to extricate 35 suitable programs in all, but suitable programs for native language teaching could not be found. The introductory materials of CD ROMs quite often promise a lot and exaggerate the advantages of the products. Most of the programs did not even include technical instructions for use to enable the student to get the program running, let alone to derive benefit from it.

4. Developing the learning tasks

The research group reviewed the situation and redefined the research task. Versatile use of the available programs is economically and pedagogically justified. After "playing" the CD ROM program as such the students often noticed they had failed to make any notes, and they had been mesmerised to spend too much time with the extra effects of the program. For that reason we made a decision to concentrate on developing a pedagogical model containing other easily readable material to support the CD ROM program, for example by providing means of answering questions. Gradually, a pedagogical model evolved that could utilise a CD ROM program as a resource for process writing. This will require simultaneous operation of a CD ROM and text processing.

More than 60 students participated in the final development of learning tasks. Of these 18 had clearly discernible learning disabilities of different kinds. The learning tasks were created on the basis of CD ROM programs dealing with the topics relevant to the occupational field. The programs were either ready-made educational programs or encyclopaedic ones. Regardless of the topic, the basic structure of the task was:

1. The student calls to mind what information he/she already possesses about the given topic, assisted by reading questions and makes notes on them with dashes, using the text processing program

2. The student becomes acquainted with the operating of the CD ROM program, using practical advice provided

3. The student retrieves information from the CD ROM program and he is assisted in information retrieval in the form of questions

4. The student starts to plan the essay proper by means of pregathered information, turning it into a mind map

5. The student writes the essay using the mind map

6. The student uses the spellcheck function of the word processor to make corrections in his/her essay and prints it or sends it to the instructor by email

The following analysis is based on native language tasks submitted by the students, 13 of them done as pair work. The output of all the learners involved in the study was assessed by classifying their essays into atomistic (a list of unattached sentences linked to the topic), serialistic (facts listed in successive series), holistic (a structurally sound essay) and analytic (the writer gives reasons to his opinions, makes comparisons, forms evaluations and weighs causes and effects).

CD ROM programs and the type of learning task developed motivate most young people with learning disabilities. Their essays had reached a more advanced level and had a higher factual content. Out of 55 tasks 13 were analytic and 20 holistic. The learning-disabled students ´ output improved discernibly with each new essay written with the same technique but on different topics and using different CD ROM programs.

The students evaluated the tasks themselves, and most regarded them as explicit, of great interest and easy to use when writing an essay, and the word processor made writing itself easier. Writing each letter by hand is more difficult for a dyslexic than choosing it on the keyboard. The other teachers reported that students became enthusiastic about learning their mother tongue by means of CD ROM tasks, mostly work diligently and that the results were mostly of high quality and supported collaboration within the group.

Process writing complies with socio-constructive principles. The student ´s reading and writing process progresses in stages through preparation, drafting, writing, revision and checking to the finished text. The student can obtain aid from a partner or the instructor. Some learning tasks were tried out through e-mail, thereby giving tutoring in distance learning. In distance learning in particular, pairwork requires counselling so that the slower learner or the partner with the poorer computer skills does not fall into a passive role.

5. Discussion

Great care must be taken in planning the tasks. Many CD ROM programs are enormously comprehensive, one can get lost in them and the whole learning situation may be ruined if the task is incoherent. The essay task type developed will provide guidelines to a poor reader and make information retrieval seem possible. The spellchecking function of the word processor assists the writer in producing a linguistically correct essay.

The student has relatively neutral feelings about making corrections on the basis of the spellchecking function before submitting the task to the instructor. It is highly improbable that a dyslexic student would make use of a traditional essay, marked in red by the teacher, to improve on his earlier, fault-ridden work!

Many students like to give their texts a personal touch by using different fonts, lay-outs and pictures to the best of their abilities. The tasks must be devised so that there is also room for flexibility and individuality. The student is motivated by a chance to have some freedom of choice, not only to follow one model given by the instructor. Only seldom may an instructor receive requests from a dyslexic student for additional tasks in the native language, which is what happened in the experiment. The experiment required more than just a mechanical ability to play a CD ROM program. This ability they possessed (cf. Farmer 1995).

In the course of the experiment we used programs installed at individual work stations as well as network versions. A teacher is able to use a CD ROM program via a video beamer to illustrate a description in front of the whole group, or to assist students operating different programs at their work stations. It is important to choose a suitable method and ensure that everyone can work in peace, using headphones if necessary.

A task type almost corresponding to ours has also been used in the study by Hilgendorf (1998), with good results. Moreover, the experiences of Mendrinos (1992) when studying potential drop-out students support the use of CD ROM programs and show as unnecessary all preconceived ideas instructors may have about students who use computers.

Besides the usual problems connected with project work we discovered that many teachers still fear and resist computer technology, while also having feelings of guilt for not being more advanced in

computer literacy. As the experiment proceeded, their attitudes became more positive. Experiments and the expansion of innovations require collaboration over organisational boundaries and also develop it. The instructors have reported about the effect the experiment also had on their working habits: the command of teaching technology and other forms of collaboration among instructors have increased. Computing cannot remain a specialized skill mastered by a handful of instructors or just a transient experimental period. The results the research team of the institution has achieved will be disseminated for wider use.

The spreading of CD ROM learning tasks can only take place if instructors change their habits of thought. Learning cannot be tied to definite forms; one has to accept different means of completing studies. A reciprocal exchange of experiences between instructors in different fields will simultaneously change the action culture. As a result of our study, our curricula have had a permanent addition of native language learning tasks integrated to each occupational branch.

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